

Pathways from Peer Victimization to Anxiety: A Longitudinal Examination Considering the
Role of Intolerance of Uncertainty

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Submitted to the graduate degree program in Clinical Child Psychology Program
and the Graduate Faculty of the University of Kansas in partial fulfillment of the requirements
for the degree of Doctor of Philosophy.

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Date Approved: May 15, 2018

Abstract

Peer victimization reflects a robust predictor of anxiety symptoms in youth; however, pathways from peer victimization to anxiety warrant further examination. Early work supports the role of cognitions in this association. Intolerance of uncertainty, referring to one's distress associated with an inability to predict outcomes when faced with ambiguous or challenging situations, has been associated with anxiety in children, but has not been evaluated in the association between peer victimization and anxiety. Further, empirical examination of theoretical models of the development of cognitive biases is lacking. The present three-wave longitudinal study extended the current literature by comparing competing models to determine whether intolerance of uncertainty moderates and/or mediates the associations between physical and relational forms of peer victimization and anxiety to further explicate pathways from peer victimization to anxiety. Within this framework, the present study examined whether exposure to peer victimization led to increased intolerance of uncertainty, which in turn contributed to more anxiety. Additionally, the study examined whether intolerance of uncertainty moderated the link between peer victimization and anxiety, such that youth exposed to peer victimization, who also endorsed greater intolerance of uncertainty, would go on to experience more anxiety. Participants for the current study were 334 elementary-school aged children who reported on intolerance of uncertainty and anxiety, while their teachers provided ratings of forms of peer victimization. Data collection occurred at three time-points across a 12-month period, each 6 months apart. Results of the current provided support for the stability of intolerance of uncertainty and anxiety across the three time points; however, support was not found for the mediation or moderation models. Future directions and treatment implications are discussed.

Keywords: relational and physical peer victimization, anxiety, intolerance of uncertainty

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Pathways from Peer Victimization to Anxiety: A Longitudinal Examination Considering the Role of Intolerance of Uncertainty

Peer victimization constitutes consistent and repeated exposures to direct and indirect forms of maltreatment by peers and has been identified as a robust and consistent predictor of later adjustment problems for youth (Bierman, Kalvin, & Heinrichs, 2015; Reijntjes et al., 2011; Reijntjes, Kamphuis, Prinzie, & Telch, 2010). In particular, children who experience peer victimization appear to be especially vulnerable to developing anxiety disorders (Averdijk, Müller, Eisner, & Ribeaud, 2011; Loukas & Pasch, 2013; Singh & Bussey, 2010; Storch, Masia-Warner, Crisp, & Klein, 2005). The current longitudinal study sought to extend the existing literature in a number of ways. Firstly, the current study aimed to elucidate the role of intolerance of uncertainty in the associations between two forms of peer victimization and anxiety. Intolerance of uncertainty is a cognitive bias which causes individuals to view uncertainty as dangerous and has been previously unstudied in the associations between peer victimization and anxiety in elementary school aged children. Specifically, the potential mediating and moderating effects of intolerance of uncertainty in the associations between physical and relational forms of peer victimization and anxiety were examined, as well as gender differences in these associations. Further, through examination of the mediation model, the present study extends empirical examination of the theoretical literature regarding the development of cognitive biases in youth, to evaluate whether peer victimization functions as a risk factor in the development of intolerance of uncertainty.

Peer Victimization

Peer victimization is recognized as a major public health concern (Gini & Pozzoli, 2009) and a significant percentage of youth endorse experiences of peer victimization throughout

childhood and adolescence (Analitis et al., 2009; Craig et al., 2009). Peer victimization refers to maltreatment by ones' own peers meant to cause physical harm or damage social relationships and may include friends or acquaintances as well as bullies (Analitis et al., 2009; Graham, Bellmore, & Juvonen, 2003; Morrison, You, Sharkey, Felix, & Griffiths, 2013). Research demonstrates that peer victimization consistently predicts concomitant (for a review see Hawker & Boulton, 2000) and future problems (e.g., Reijntjes et al., 2011; Reijntjes et al., 2010; Stapinski, Araya, Heron, Montgomery, & Stallard, 2015), and may have enduring effects on functioning that last well into adulthood, above and beyond exposure to other environmental risk factors (Wolke, Copeland, Angold, & Costello, 2013). In sum, children and adolescents may experience peer victimization at some point, and the experience of peer victimization likely increases their risk for detrimental outcomes in the long-term.

Developmental psychopathology provides a framework from which to approach the peer victimization literature. From a theoretical perspective, developmental psychopathology emphasizes how individual and environmental factors correlate and interact with each other across development to determine an individual's trajectory towards a given outcome (Beauchaine, 2003; Cicchetti & Rogosch, 1996). A component part of developmental psychopathology is the concept of multifinality, which stipulates that people exposed to the same risk factor may face a multitude of outcomes (Wilden, 1980; Cicchetti & Rogosch, 1996). Inherent within this concept is the necessity to better understand specific pathways from a given risk factor to maladaptive sequelae. With the literature clearly supporting peer victimization as a notable risk factor for poor psychological outcomes (Reijntjes et al., 2010; Hawker & Bolton, 2000), researchers emphasize the need for continued research examining how peer victimization contributes to maladaptive outcomes (Kochenderfer-Ladd & Troop-Gordon, 2010; Storch &

Ledley, 2005). Despite the emphasis placed on better understanding the role and contribution of peer victimization to later negative outcomes, examination of the specific pathways from peer victimization to maladaptive outcomes has been limited in scope.

From a developmental psychopathology approach, the timing of exposure to peer victimization may also have important implications related to outcome. Indeed, exposure to peer victimization varies across development (Bradshaw, Sawyer, & O'Brennan, 2007; Williams & Guerra, 2007), and previous research has documented that 60% to 92% of children report being victimized at least once at some point during elementary school (Fite et al., 2013; Kochenderfer-Ladd & Wardrop, 2001). Specifically, research demonstrates that peer victimization tends to escalate during late childhood and reaches its apex during early adolescence (Bradshaw et al., 2007; Bradshaw, Waasdorp, & O'Brennan, 2013; Williams & Guerra, 2007). Further, as peer victimization increases across this developmental period, youth may also be at increased risk of experiencing peer victimization both in and outside of school (Turner, Finkelhor, Hamby, Shattuck, & Ormrod, 2011). Indeed, based on a national sample of 6-17 year olds, for youth who experienced victimization, a majority (i.e., 53%), reported such instances occurring exclusively in the school context, whereas up to 20% of victimized youth indicated they endured victimization inside and outside of school. Risk of experiencing victimization across multiple settings is of particular importance, as youth may not know when or where they may experience victimization, and whether an adult may be present to intervene. Developmental trends in the peer victimization literature underscore the necessity of examining the associations between peer victimization and psychological outcomes during late childhood and into early adolescence to inform prevention and intervention work.

Forms of Peer Victimization

Peer victimization can take many forms, with the two most common forms seen throughout childhood being physical and relational in nature (Crick & Bigbee, 1998). Physical victimization is defined as damage caused by demonstrable acts perpetrated on an individual with the intention of physically harming them (e.g., kicking, hitting), whereas relational victimization is defined as methods intended to damage the social standing of an individual (e.g., through rumor spreading or purposeful exclusion; Crick & Bigbee, 1998). Distinction between these two forms of peer victimization has demonstrated important implications for both research and intervention. Indeed, the literature illustrates that outcomes may differ, at least in part, due to the difference in form of victimization (Heilbron & Prinstein, 2010; Turner et al., 2011).

General consensus in the literature suggests a decrease in physical victimization from childhood to adolescence (Bradshaw et al., 2013; Galen & Underwood, 1997; Pettit, 1997; Williams & Guerra, 2007), due in part to decreased social acceptability of such behaviors and increased maturity (Tremblay & Nagin, 2005). Exposure to physical victimization has been linked to specific outcomes, including risk for substance use in young adolescents (Sullivan, Farrell, & Kliewer, 2006), rule-breaking behavior in adolescents (Cooley, Fite, Rubens, & Tunno, 2015), internalizing symptoms (Crick, Casas, & Ku, 1999) and externalizing behaviors (Coie & Dodge, 1998; Kawabata & Crick, 2013).

As physical victimization is expected to wane from late childhood to adolescence, relational victimization tends to increase across this developmental period as children mature and develop the social-cognitive skills necessary to engage in relational aggression (Bjorkqvist, Lagerspetz, & Kaukiainen, 1992; Murray-Close, Ostrov, & Crick, 2007). The literature documents negative consequences of relational victimization (including damage to social

relationships and peer interactions), which may inhibit the development and maintenance of friendships associated with relational victimization (Crick & Bigbee, 1998; Crick & Grotpeter, 1996; Crick et al., 2001). Further, exposure to relational victimization may contribute to poor academic performance (Fite, Cooley, Williford, Frazer, & DiPierro, 2014), and predict later depression and internalizing symptoms (Kawabata & Crick, 2013; Kawabata, Tseng, & Crick, 2014; Mathieson, Klimes-Dougan, & Crick, 2014), above and beyond outcomes attributed to physical victimization (Crick & Bigbee, 1998; Crick & Grotpeter, 1996).

Taken together, the research illustrates the importance of evaluating outcomes separately based on the form of victimization experienced by youth. Given the differences in developmental trends for victimization, as well as differences in outcomes associated with each form of victimization, research must evaluate pathways from victimization to outcomes separately for each form.

Peer Victimization and Anxiety

While the literature consistently reports the psychological consequences associated with exposure to peer victimization, recent work indicates that peer victimization may be an especially robust predictor for internalizing symptoms in youth (Reijntjes et al., 2010; Schwartz, Lansford, Dodge, Pettit, & Bates, 2015). Notably, a prospective longitudinal study identified peer factors, namely victimization, as contributing to later anxiety symptoms above and beyond the influence of family and parental factors from late childhood through adolescence (van Oort, Greaves-Lord, Ormel, Verhulst, & Huizink, 2011). Indeed, frequency of victimization (Stapinski et al., 2014) and type of victimization have been related to anxiety outcomes, with a specific link between relational victimization and anxiety, compared to physical victimization (Siegel, La Greca, & Harrison, 2009; Storch et al., 2005). In a five-year longitudinal study, victimization

experienced at age 13 (compared to no victimization) resulted in a two to three times greater risk for experiencing clinical anxiety by age 18 over and above other risk factors (e.g., previous anxiety and depression, parental anxiety and depression; Stapinski et al., 2014).

A better understanding of the links between peer victimization and anxiety is particularly important given that anxiety disorders are one of the most common diagnoses in children and adolescents (Cartwright-Hatton, McNicol, & Doubleday, 2006; Merikangas et al., 2010). These early symptoms can contribute to long-term psychosocial difficulties in adulthood (e.g., Benjamin, Harrison, Settipani, Brodman, & Kendall, 2013; Lopez, Turner, & Saavadra, 2005). Clinically anxious youth face greater risk of developing depression (Merikangas, Nakamura, & Kessler, 2009; Merikangas & Avenevoli, 2002), substance use disorders (Merikangas et al., 2009), and suicidality (Rudd, Joiner, & Rumzek, 2004). Clinical anxiety may develop as early as five to six years of age, and risk for anxiety increases from childhood to adolescence (Merikangas et al., 2009). Given the demonstrable role of peer victimization in the development of anxiety symptoms, further research in this area is warranted.

The Role of Cognitions in Peer Victimization and Anxiety: Why Look At Intolerance of Uncertainty?

Cognitive factors feature predominantly in the peer victimization and anxiety literatures (e.g., Crick & Dodge, 1994; Taylor, Sullivan, & Klierer, 2013), and may help elucidate the pathways from peer victimization to anxiety as well as allow for empirical examination of the developmental theories of cognitive biases. Initially outlined by Crick and Dodge (1994), social-cognitive theory emphasizes the role of cognitions in the interpretation of and response to social experiences (e.g., peer victimization), and provides perspective on how cognitive factors contribute to the link between victimization and psychopathology. Specifically, Crick and

Dodge (1994) stipulate that cognitive factors serve to filter how a child interprets and responds to external social cues, which in turn dictates behavioral and emotional responses. Disruptions at any stage of this process (e.g., misinterpretation of cues or consideration of maladaptive responses) may serve to increase the likelihood of a maladaptive outcome. While Crick and Dodge's (1994) original model was developed to explain aggressive behavior in youth, extant research demonstrates the role of cognitions in the peer victimization and internalizing literature as well (e.g., Giannotta, Settanni, Kliewer, & Ciairano, , 2012; Graham & Juvonen, 1998; Grills & Ollendick, 2002; Taylor et al., 2013). Moreover, cognitive theory emphasizes the role of cognitive distortions (e.g., threat-related information processing biases, intolerance of uncertainty) in the development and maintenance of anxiety symptoms (Cartwright-Hatton, Tscherntiz, & Gomersall, 2005; Miers, Blöte, Heyne, & Westenberg, 2014). According to Kendall and MacDonald (1993) cognitive distortions refer to a disruption in the typical cognitive process that functions to alter a child's thought process leading to misinterpretations of his/her environment or self. Within this framework a child's cognitive distortion may develop from (mediate), or interact with (moderate), environmental risk factors, which cultivate, maintain and exacerbate anxiety symptoms (e.g., van Oort et al., 2011).

Crick and Dodge's (1994) model can be integrated into existing developmental theories of anxiety and the development of cognitive biases to better understand how peer victimization may contribute to the development of a cognitive bias. Indeed, developmental models of anxiety outline the role of learning, such that through exposure to certain events youth may be conditioned to experience an anxious response, such as a cognitive bias, either through transmission of a direct message (e.g., a parent telling a child a situation is dangerous), or through associative learning (i.e., a previously harmless stimulus linked with a negative

outcome; for a review see Waters & Craske, 2016). Prevailing developmental theories regarding cognitive biases, posit an acquisition model that stipulates cognitive biases are not evident early in development, but rather develop overtime, initially appearing once a child exhibits the cognitive abilities required for the bias (Field & Lester, 2010). Fundamentally, the acquisition model suggests that only a subset of youth may develop certain cognitive biases as a result of the presence of certain risk factors, and that through the development of this bias go on to experience anxiety (Field & Lester, 2010). In conjunction with developmental models of anxiety, it follows that through repeated exposure to a risk factor such as peer victimization (i.e., learning process), youth may acquire a cognitive bias, which subsequently contributes to later anxiety. To date, there has been limited research examining the development of information-processing biases in youth. Further, the existing research has focused primarily on the role of parents (e.g., Hadwin, Garner, & Perez-Olivas, 2006); therefore, additional research examining other processes by which cognitive biases develop and contribute to later anxiety is needed.

Within the anxiety literature the cognitive bias intolerance of uncertainty, which entails an individual's maladaptive beliefs about, or response to, uncertain situations (Dugas, Laugesen, & Bukowski, 2012; Carleton, 2016; Carleton, Norton, & Asmundson, 2007; Comer et al., 2009), has been theoretically linked to broadly underlie the development and maintenance of clinical anxiety (Carleton, 2016; Comer et al., 2009). Intolerance of uncertainty represents an important construct in understanding the development of clinical anxiety, as humans are evolutionarily primed to view uncertainty in the environment as threatening, a process that subsequently activates the behavioral activation system (BIS; Carleton, 2016; Gray & McNaughton, 2003). The BIS serves to modulate an individual's assessment and behavioral response to environmental cues (Carleton, 2016; Gray & McNaughton, 2003). In typical individuals, the BIS consistently

integrates information from the environment, including possible risk and safety signals, to assess the degree to which a given uncertainty may cause actual harm (Gray & McNaughton, 2003). For individuals with intolerance of uncertainty, however, this process incorrectly perceives a relatively harmless uncertainty (e.g., a child not knowing if mom or dad is picking him/her up from school), as actually threatening, activating an anxious response (Riskind, 1997; Riskind, Rector, & Taylor, 2012). Recent empirical examination of cognitive models of anxiety identify intolerance of uncertainty as a fundamental component of both anxiety and worry, and suggests that intolerance of uncertainty may actually precede, and exacerbate, other cognitive distortions associated with anxiety (e.g., threat-related biases; Carleton, 2016; Hong & Cheung, 2015); therefore, targeting intolerance of uncertainty specifically in prevention and intervention efforts may inherently inhibit the development of, or decrease the presence of other anxious cognitions. Additional research regarding intolerance of uncertainty is urgently needed as humans are evolutionary predisposed to view uncertainty as dangerous, which inherently increases the risk of problematic intolerance of uncertainty. Further, intolerance of uncertainty may actually be a fundamental cause of future anxious cognitions and behaviors and likely represents a transdiagnostic risk factor for multiple anxiety disorders. Taken together, intolerance of uncertainty may ultimately represent an early vulnerability for future clinical anxiety and therefore a central focus for preventative interventions.

Within the pediatric anxiety literature, intolerance of uncertainty has been associated with worry (Comer et al., 2009; Dugas et al., 2012) and anxiety in children as young as 7 years of age (Boelen & Reijntjes, 2009; Comer et al., 2009; Read, Comer, & Kendall, 2013). Though strongly related to anxiety (r s= .30-.71), intolerance of uncertainty is a distinct construct that contributes to both pediatric anxiety symptoms and diagnostic severity assessed by child-report

during diagnostic interview (Boelen, Vrinssen, & van Tulder, 2010; Comer et al., 2009; Read et al., 2013). Further, intolerance of uncertainty appears to be stable over time, demonstrating a slightly decreasing linear trend across five years in a sample of adolescents (Dugas et al., 2012), suggesting that intolerance of uncertainty reflects a relatively longstanding characteristic. Evidence of intolerance of uncertainty during early childhood bolsters the argument that the evolutionary predisposition may escalate to a cognitive distortion during childhood and increase risk for future clinical anxiety.

Generally, research examining intolerance of uncertainty in child anxiety is in its nascence, especially with younger samples, but early work suggests it is an important factor in child anxiety. Traditionally, intolerance of uncertainty has been associated with generalized anxiety disorder in children and adolescents (Comer et al., 2009; Read et al., 2013), but recent work suggests intolerance of uncertainty may also occur in other anxiety disorders, such as social anxiety in adolescents (Boelen & Reijntjes, 2009). On the whole, intolerance of uncertainty reflects an integral construct within clinical anxiety, and there is evidence that it may function as a cognitive vulnerability factor for worry and clinical anxiety in youth.

The Mediating and Moderating Role of Cognitions in the Link between Peer Victimization and Anxiety

In line with previously reviewed theory (e.g., Crick & Dodge, 1994; Field & Lester, 2010; Waters & Craske, 2016), recent research provides preliminary support for both the moderating (Ghoul, Niwa, & Boxer, 2013; Grills & Ollendick, 2002) and mediating (Barchia & Bussey, 2010; Dyson, Robertson, & Wong, 2015; Hoglund & Leadbeater, 2007; Taylor et al., 2013) effects of cognitive variables and attributional biases on the relation between peer victimization and internalizing symptoms in youth. Indeed, Ghoul and colleagues (2013) found

that the extent to which adolescents' perceptions of self-worth were based on how others evaluate them moderated the association between exposure to peer victimization and internalizing symptoms. Specifically, adolescents who conceptualized self-worth based on external cues, and were exposed to more peer victimization, experienced more internalizing symptoms. Similarly, in a sample of 11 to 13 year olds Grills and Ollendick (2002) found that boys' evaluation of their self-worth interacted with peer victimization to predict anxiety, such that boys' self-worth buffered the impact of peer victimization on anxiety, and consequently boys who reported greater self-worth, in conjunction with greater exposure to peer victimization, consequently reported less anxiety symptoms.

Studies have demonstrated support for the mediating role of cognitive distortions, specifically hostile attribution bias and threat interpretation bias between peer victimization and internalizing symptoms in youth 11.5 years to 13.9 years of age, such that exposure to peer victimization resulted in increased cognitive biases, which in turn resulted in increased internalizing symptoms (Giannotta et al., 2012; Hoglund & Leadbeater, 2007). While there has been general support for the mediational role of information processing biases in the peer victimization and internalizing literature, findings examining anxiety specifically are unclear. First, much of the previous research has grouped depression and anxiety together (Dyson et al., 2015; Hoglund & Leadbeater, 2007; Giannotta et al., 2012; Taylor et al., 2013), despite evidence that anxiety and depression demonstrate discrete symptom profiles in youth (Cannon & Weems, 2006). Further, given the different developmental trends, such that anxiety may develop at a younger age (Cole, Peeke, Martin, Truglio, & Seroczynski, 1998; Merikangas et al., 2009; Pine, Cohen, Gurley, Brook, & Ma, 1998) and therefore necessitate earlier intervention, evaluation of these associations looking specifically at anxiety is needed.

Much of the research looking at anxiety specifically has examined a limited number of cognitive distortions (i.e., threat-related interpretation biases or attributional biases), has utilized cross-sectional designs (Chen & Graham, 2012; Giannotta et al., 2012; Graham & Juvonen, 1998; Hoglund & Leadbeater, 2007), and results have been mixed. Indeed, one longitudinal study that examined anxiety specifically failed to find support for the mediational role of threat-related cognitions in the peer victimization-anxiety link in a sample of 10 to 16 year olds (Taylor et al., 2013). Conversely, in cross-sectional studies, Chen and Graham (2012) and Graham and Juvonen (1998) demonstrated that self-blame attributional biases significantly mediated the association between peer victimization and social anxiety in samples of early and late adolescents, such that greater experiences of peer victimization led to more self-blame attributional biases which in turn resulted in increased anxiety symptoms. Though the previously reviewed studies have looked at these associations in older samples, previous research has demonstrated that cognitive biases in younger children (as young as 5 years old) can be influenced through social experiences (Barrett, Rapee, Dadds, & Ryan, 1996; Hane & Barrios, 2011; Prinstein, Cheah, & Guyer, 2005). In summary, an important next step is to further examine how cognitions contribute to associations between peer victimization and anxiety in younger children, and particular focus on intolerance of uncertainty is warranted given evidence that intolerance of uncertainty may precede other cognitive distortions and consequently represents a possible target for prevention efforts.

Intolerance of Uncertainty: Evidence for Mediation and Moderation

While the existing literature lends general support for the link between intolerance of uncertainty and anxiety in children, few studies have examined more complex associations between these variables in the child literature. Better understanding the role of intolerance of uncertainty in relation to environmental risk factors and anxiety can be gleaned by examining the adult literature. Indeed, there is support for intolerance of uncertainty moderating the association between daily stress and anxiety symptoms in adults, such that greater stress coupled with more intolerance of uncertainty predicted more anxiety symptoms (Chen & Hong, 2010).

Additionally, in one retrospective study Zlomke and Young (2009) found that intolerance of uncertainty mediated the relation between recall of anxious parenting and current anxiety symptoms in a sample of college students. That is, anxious parenting was associated with higher intolerance of uncertainty, which in turn was associated with more anxiety symptoms. Evidence of intolerance of uncertainty serving as both a mediator and moderator in the associations between environmental risk factors and anxiety symptoms in the adult literature highlights the need to examine mediating and moderating associations in child anxiety. Further, empirical work evaluating the developmental theories of cognitive biases (Field & Lester, 2010; Waters & Craske, 2016) in younger youth is lacking, and work is needed to examine whether associations found in older populations (i.e., adolescents and adults) are present in younger youth. Support for these trends during an earlier developmental period would inform prevention interventions.

The Current Study

An important next step in understanding pathways from peer victimization to anxiety is to examine the role of intolerance of uncertainty in this relation. Peer victimization, through its interference in a child's social functioning, creates instability in the child's social environment, peer relationships and interactions (Björkqvist, Ekman, & Lagerspetz, 1982; Boulton & Smith,

1994; Crawford, & Manassis, 2011; Schwartz, Dodge, & Coie, 1993). This instability may contribute to the development of intolerance of uncertainty, which in turn increases anxiety. Further, while peer victimization is traditionally considered within the school context, youth may experience peer victimization in a variety of situations (Fite et al., 2013; Turner et al. 2011). The uncertainty regarding when a child may be at risk for experiencing peer victimization may further contribute to the development of intolerance of uncertainty. This may be especially true for relational victimization, given the less observable (i.e., more uncertain) behaviors in this particular form of victimization (Cairns, Cairns, Neckerman, Ferguson, & Gariepy, 1989; Cullerton-Sen & Crick, 2005). Thus, peer victimization may be the learning experience that contributes to youth developing intolerance of uncertainty, which in turn, contributes to later anxiety.

Alternatively, intolerance of uncertainty may serve to exacerbate the association between peer victimization and anxiety, such that youth who experience peer victimization and endorse greater intolerance of uncertainty may experience the greatest levels of anxiety. Given the demonstrated stress reaction children experience when exposed to peer victimization (Crosby, Oehler, & Capaccioli, 2010; Vaillancourt et al., 2008), it fits that youth who experience victimization in conjunction with high intolerance of uncertainty may be at greater risk for anxiety.

In sum, the present study seeks to extend the current literature by examining pathways from different forms of peer victimization to anxiety symptoms in elementary school-aged children. To this end, the current longitudinal study examined the role of intolerance of uncertainty in the relations between peer victimization and anxiety. Specifically, this project compares competing models to determine if intolerance of uncertainty moderates and/or

mediates the associations between physical and relational forms of peer victimization and anxiety. Further, the current study examines whether there are gender differences in these associations; however, given the inconsistency within the literature regarding directionality of gender effects specific hypotheses regarding gender are not clear.

The mediational model (see Figure 1) will serve to inform mechanisms by which peer victimization leads to anxiety in youth. It is hypothesized that peer victimization will result in increases in intolerance of uncertainty, which in turn will lead to increases in children's anxiety symptoms. It is anticipated that these associations will be most pronounced for relational victimization. In addition, the mediational model will inform theoretical models of the development of cognitive biases in youth. It is also possible that other factors (e.g., parental modeling of anxious behavior; Zlomke & Young, 2009), contribute to the development of intolerance of uncertainty, and then the interaction between peer victimization and intolerance of uncertainty work together to exacerbate levels of anxiety. Therefore, intolerance of uncertainty is also expected to serve as a moderator of the association between peer victimization and children's anxiety (see Figure 2), such that the association between peer victimization and anxiety will be strongest when youth also endorse high intolerance of uncertainty.

Finally, given extant research indicating the role of gender in peer victimization and anxiety gender differences will also be examined. Within the peer victimization literature, previous research suggests that gender may impact the form of peer victimization youth experience (Rueger & Jenkins, 2014; Scheithauer, Hayer, Petermann, & Jugert, 2006; Turner et al., 2011), as well as youths' response to peer victimization (Kochenderfer-Ladd & Skinner, 2002; Salmivalli, Karhunen, & Lagerspetz, 1996; Visconti, Sechler, & Kochenderfer-Ladd, 2013). Further, girls may be at greater risk for anxiety than boys, a gender difference that

becomes apparent in samples as young as five (e.g., Merikangas et al., 2009; Puskar, Bernardo, Ren, Stark, & Lester, 2009). As a result, gender differences in the proposed models will be examined as well.

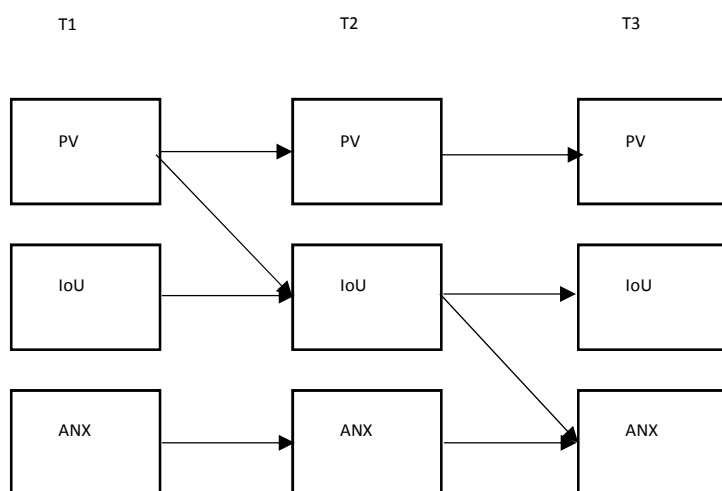


Figure 1. Conceptual cross-lagged panel mediational model

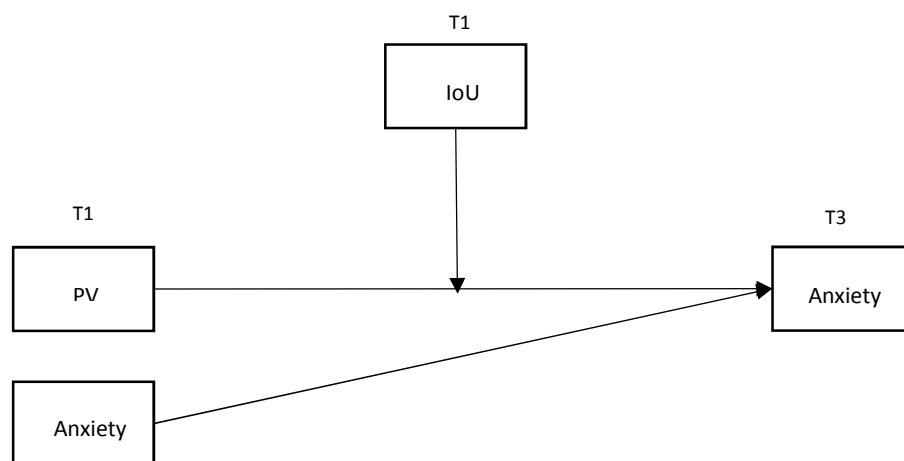


Figure 2. Conceptual moderation model.

Method

Participants and Procedures

All study procedures were reviewed and approved by the investigator's institutional review board and school administration. The current study built on an existing collaboration

between the Child Behavior Lab at the University of Kansas and a nearby elementary school, where research has been taking place since the Fall of 2012. Measures for the current study were added for data collection during the academic year 2015-2016. Data collection occurred at three time points: Time 1: November 2015; Time 2: April 2016, and Time 3: October 2016.

Student recruitment occurred through an online system managed by the school for back-to-school enrollment. Before the start of the school year, interested parents completed an online consent form for data collection in the Fall and the Spring (i.e., the academic year). Recruitment for the third time point in October 2016 followed a similar procedure. Teacher recruitment occurred following a brief presentation at an in-service meeting during the Fall semester, and teachers provided consent for participation during that academic year. Within one month of each of the student data collections, teachers completed measures utilizing the online survey system Qualtrics (Qualtrics, Provo, UT). For the current study, teachers reported on student behavior and experiences with peer victimization. Of note, teacher report of victimization did not require parental consent or student assent (as approved by the institutional IRB) given that teachers reported on all students (i.e., they did not single out any student), and they answered questions regarding behaviors they would typically monitor and report to school administrators (i.e., victimization/aggression). For full participation (i.e., completing surveys for each student), teachers received \$60 dollars during Time 1 data collection and \$65 for Time 2 and Time 3 data collections. Across all scheduled data collections teachers received \$25 for partial completion. Individual surveys (one survey per student in the teacher's classroom) took approximately 10 minutes to complete.

For individual students to be included in the current study there must have been data provided at time one, by either the student, a teacher, or both. Further, inclusion required that the

individual participant have at least one data point from each reporter (i.e., student or teacher) across the three data collection periods (e.g., students were included who had teacher data at Times one and two, and then student data at Time three). The final sample size for the current study included 334 students out of 398 3rd-5th grade students (84% participation rate).

For the 2015-2016 academic year, 330 parents provided consent. During the period between parental consent and data collection for Time 1, three consented students became unavailable (one student had moved, and two students were in a special education classroom); therefore, 327 students were approached for assent during Time 1 data collection. During student data collection, trained research assistants visited each classroom at which time nonconsented students and teachers left the room. Research assistants reviewed assent, and interested students provided verbal assent. At this time, if any student decided not to participate, they left the room to join their teacher and other students in the waiting area. Of the 327 students approached at Time one, 321 students provided verbal assent and data (two students declined, two students were absent for data collection, two students assented, but did not provide data). Research assistants read each survey item verbatim before students responded. Additional research assistants circulated throughout the classroom to assist any student who needed help or had any questions. Measures for the current study were part of a larger assessment battery students completed, which typically took about 25 minutes to complete. Students received nominal prizes (e.g., pencils) as compensation for their participation.

At Time 1, 100% of third through fifth grade teachers consented, and provided data for 332 students (two students without teacher data provided child data at Time 1). Considering available data at Time 1, and subsequent participation that allowed for at least one teacher-reported data point and at least one child-reported data point across the three data collection

periods, the final sample size for the study included 334 students. Of those 334, seven did not have parental consent until Time 3, but did have teacher data at Time 1, allowing for inclusion in the study (i.e., $327+7=334$). At Time 2, 315 students provided assent and data (three student declined, two students were absent, four students had moved prior to data collection, one student was in another classroom, and two students assented but did not complete measures) and teachers reported on 329 students.

Recruitment during academic year 2016-2017 followed the same procedures as the previous year. Based on the included sample at Time 1 (334), and accounting for the 4 students who moved before data collection in at Time 2 (330), and excluding the 97 fifth graders included at Time 1, data at Time 3 were expected on 233 students. Parents were contacted about the study during annual student enrollment and 185 parents provided consent. Of the 185 completed consents, seven were for newly consented students, who had data from teachers at Time 1, but not parental consent (i.e., across the three time points, parents provided consent for 334 students included in the study). Of those youth, 170 provided assent and data (six students were absent, two students moved, one student declined, six students assented, but did not complete measures). Similarly, teachers completed consent during a teacher in-service meeting during the Fall. Teachers reported on 207 students at Time 3.

Including all 334 participants with data at Time 1, the final study sample included 161 (48.2%) girls and 173 (51.8% boys). At Time 1, 106 (31.7%) students were in third grade, 131 (39.2%) were in fourth grade, and 97 (29.0%) were in fifth grade. According to school records, a majority of the student body is Caucasian (>80%). Though individual information about socioeconomic background was not formally assessed, information from the school indicates that roughly 35% of the student population are eligible for lunch vouchers.

Measures¹

Demographics. Students completed a short measure reporting on demographic variables including gender and age.

Peer Victimization. Peer victimization was evaluated using teacher reports of Crick and Bigbee's (1998) relational and physical aggression measure, which provided scores of both physical (overt acts intended to physically harm another person; "gets pushed or shoved by others," "gets hit") and relational (acts intended to damage one's social standing and relationships; "gets ignored by other kids when someone is mad at them," other kids tell rumors about them behind their backs") victimization. Each subscale included 3-items. This measure has demonstrated reliability and convergent validity within elementary-school aged samples (e.g., Cooley & Fite, 2015) and internal consistency was strong for the current study for physical victimization ($\alpha=.83-.89$) and relational victimization ($\alpha=.93-.96$) across time points.

Intolerance of Uncertainty. The Intolerance of Uncertainty Scale Short Form for Children (IUS-C; Boulter, Freeston, South, & Rodgers, 2014) was completed by children. The measure included 12-items assessing children's response to uncertain situations (e.g., "It bothers me when there are things I don't know," "I always want to know what will happen to me in the future"). Children rated each item on a 5-point Likert scale ranging from "1-Not like me" to "5-Entirely like me." Boulter et al. (2014) adapted the IUS-C from the Intolerance of Uncertainty Scale-12 (IUS-12; Carleton et al., 2007), an adult measure modified from the 27-item Intolerance of Uncertainty Scale (IUS; Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994). Boulter and colleagues adapted their measure for use with children as young as 8 years old, and items

¹ All study measures are included in the appendix.

and response choices reflect an appropriate reading level for this age. The short-form of the IUS has demonstrated reliability and convergent validity correlating with anxiety (Carleton et al., 2007; Fergus, 2015).

Given that use of the IUS-C was limited before inclusion in the current study, a factor analysis using Time 1 data was evaluated. Results provided support that the IUS-C represents a unitary construct ($\chi^2_{(54)} = 85.63, p = .004$; RMSEA = .04; CFI = .96; SRMR = .04).² Each item loaded on the single factor (.52-.70, all $ps < .001$). Further, the IUS total score was strongly correlated with, but distinct from, anxiety ($r = .66, p < .01$). The IUS-C exhibited strong internal consistency across time points ($\alpha s = .87-.88$).

Anxiety. Children completed the Patient-Reported Outcome Measurement Information System (PROMIS) Pediatric Anxiety-Short Form scale, an 8-item measure developed by the National Institutes of Health (NIH) to provide brief and reliable assessment of children's anxiety symptoms (Irwin et al., 2010). Items assessed behavioral and cognitive symptoms of anxiety (e.g., "I felt nervous," "I worried about what could happen to me," "I felt scared"). Children rated each item on a 5-point Likert-type scale, ranging from "1-Never" to "5-Almost Always." The PROMIS Anxiety scale has been used with children as young as 8 years of age, and has demonstrated reliability (both internal consistency and test-retest reliability) and convergent validity (Varni et al., 2014). Internal consistency in the current study was strong across time points ($\alpha s = .87-.91$).

² Note: Factor analysis of the IUS-C indicated that a two-factor model (i.e., prospective IU and inhibitory IU) exhibited slightly improved model fit over the one-factor model; however, given the fit indices of the one-factor model, the large correlation between the two factors ($r = .89$), and the general approach in the literature to treat IU as a unitary construct (i.e., Boelen et al., 2010; Carleton et al., 2007), it was deemed appropriate to proceed with analyses utilizing a single factor IU construct.

Data Analysis

Composite scores for each variable were computed by calculating the mean of scale items. If more than 50% of items were missing for a specific scale for an individual, then the composite score was considered missing for that student. Initially, all data were evaluated to examine descriptive statistics (means, standard deviations, skewness, kurtosis), as well as patterns of missing data (see Table 1). Bivariate correlation coefficients between variables were examined to evaluate initial associations (see Table 1).

Though the original data analysis proposal stated that maximum likelihood estimation within a structural equation model framework would be used for model testing, recent statistical developments have allowed for procedures to address nested data even when clusters change across time (i.e., students in a new classroom for the third time point); therefore, models were estimated within a multilevel framework. Specifically, cross-classified multilevel models utilizing Bayesian estimation were conducted. This approach relies on a Markov chain Monte Carlo algorithm to generate posterior distributions utilizing the Gibbs sampler to address missing data. As the current analyses employed noninformative priors, such that there were no a priori expectations regarding the distribution of included parameters, which may impact the construction of the posterior distribution, analyses produce comparable estimates to full-information maximum likelihood while accounting for variance associated with students nested within classroom (Muthen & Asparouhov, 2012; Zyphur & Oswald, 2015). Within cross-classified models examination of the significance of specific pathways (such that the 95% confidence interval of the estimated mu beta is examined to determine whether it contains zero; Muthen & Asparouhov, 2012) are evaluated as well as calculation of a pseudo- R^2 effect size which indicates the relative improvement in the model by the inclusion of additional pathways

(Hoffman, 2015). Initially, intraclass correlation coefficients (ICCs) were calculated to determine the variance in victimization accounted for by nesting within classrooms. Individual ICCs indicated that between 11% to 49% of the variance in victimization was related to classroom environment providing support for the use of multilevel analyses. In all models, gender and grade were included as covariates. Evaluation of the mediation and moderation models are discussed below.

Mediation model. Tests of mediation involve a procedure that necessitates examination of direct associations between the independent variable (X), the dependent variable (Y), and the proposed mediating variable (M; Preacher & Hayes, 2004). To show longitudinal mediation, X at Time 1, must predict M at Time 2, which in turns predicts Y at Time 3 (Little, 2013). For the present study, the initial analysis estimated an empty-means model, such that each variables' mean could differ across classrooms and time points, which allows for the examination of the degree of influence on each dependent variable by the subsequent inclusion of specific pathways.

Successive models included additional pathways to assess the stability of variables across time and the hypothesized direct effects across time. Specifically, direct pathways were estimated from each form of peer victimization at Time 1 to intolerance of uncertainty at Time 2, and then intolerance of uncertainty at Time 2, predicting anxiety at Time 3. As guided by Cole and Maxwell (2003) an additional model examined the inclusion of a direct effect between each form of peer victimization at Time 1 predicting anxiety at Time 3, as well as a model examining direct effects in the reverse direction of the hypothesized mediational pathway (i.e., anxiety at Time 1 predicting intolerance of uncertainty at Time 2, and then intolerance of uncertainty predicting each form of peer victimization at Time 3) were estimated. A final model was then estimated including both mediational pathways (i.e., hypothesized and reverse causal).

Moderation model. Before testing moderation, variables were mean-centered, to reduce multicollinearity when examining interaction effects and benefit interpretation of findings (Aiken & West, 1991). To continue to account for the multilevel structure of the data, moderation was examined within a cross-classified model, with a cross-product of each form of peer victimization and intolerance of uncertainty assessed at Time 1. Significant moderation occurs when after controlling for the main effects of each predictor, and earlier anxiety symptoms, the interaction term between peer victimization and intolerance of uncertainty (measured at Time 1) significantly predicts anxiety at Time 3. If the interaction term is significant, simple slope analyses are conducted to examine the association between peer victimization and anxiety at different levels of intolerance of uncertainty, following conventional procedures (i.e., -1SD, mean, +1SD; Aiken & West, 1991).

Gender Differences. To examine possible gender differences in the final mediation and moderation models within a cross-classified framework, two and three-way interaction terms with gender were computed and added to the model (e.g., peer victimization x gender and peer victimization x gender x intolerance of uncertainty), such that a significant interaction indicates differences between boys and girls.

Results

Descriptive Statistics and Missing Data

Participants included in the final study comprised data on 334 students. At Time 1, teachers reported on peer victimization for 332 students (0.6% missing of 334), 321 students (3.9% missing of 334) reported on intolerance of uncertainty, and 320 students (4.2% missing of 334) reported on anxiety. At Time 2, teachers reported on 329 students' peer victimization experiences (1.5% missing of 334), 313 students (6.3% missing of 334) reported on intolerance

of uncertainty, and 315 students (5.7% missing of 334) reported on anxiety. Data provided during Time 3 included both planned missing (i.e., 5th graders from the previous year, $N=97$), and unplanned missing data from previous participants included at Time 1. At Time 3, teachers reported on 207 students, and 170 students provided data; therefore, including both planned and unplanned missing data, at Time 3 data were available for 62% of the original sample (207 out of 334), and 88.8% of the planned sample (i.e., 207 out of 233 third and fourth grade students from the previous year). As mentioned above, Bayesian estimation utilizes a Monte Carlo algorithm and the Gibbs sampler, which accounts for missing data in a similar manner as full-information maximum-likelihood (Muthen & Asparouhov, 2012). Such approaches adequately address missing data when data are available for at least 50% of participants (Collins, Schafer, & Kam, 2001; Dong & Peng, 2013; Enders & Bandalos, 2001), and therefore, appropriate for use in the present analyses. Accordingly, sample size in analyses for time three included data for 207 students.³

Anxiety and intolerance of uncertainty demonstrated acceptable skewness and kurtosis (i.e., less than 3 and 7 respectively) across time points. Due to extreme skewness and kurtosis in the victimization variables (skewness = 2.04-5.10, kurtosis = 3.64-29.64), such that a significant portion of teachers reported low victimization, physical victimization and relational victimization were dichotomized (i.e., present or absent) for subsequent analyses. Victimization variables were not transformed as the low frequency of victimization occurrences would not adequately address the skewness and kurtosis concerns. Descriptive statistics and bivariate correlations are

³Note: Across years one to two the sample size decreased significantly, partially accounted for by fifth graders transitioning into middle school. To evaluate the impact on results, analyses were conducted on the subset of participants in third and fourth grade during year one. Results of the mediation models followed the same pattern as analyses utilizing the whole sample. The moderation model would not converge with only third and fourth graders; therefore presented analyses include the entire sample in order to utilize the most robust statistical analyses available.

in Table 1. It is worth noting that across time points teachers reported limited occurrence of both relational victimization (18.8%-26.7%) and physical victimization (8.7%-12.5%; see Table 2). Anxiety scores exhibited stable, positive correlations longitudinally ($r_s=.43-.53$, $p<.001$), as did intolerance of uncertainty ($r_s=.42-.54$, $p<.001$). Intolerance of uncertainty and anxiety were consistently correlated both within time ($r_s=.55-.66$, $p<.001$) and longitudinally ($r_s=.29-.46$, $p<.001$), indicating that these variables share between 8.4%-44.5% of their variance, representing strongly correlated, but distinct, constructs.

Relational and physical victimization exhibited consistent positive correlations within time ($r_s=.52-.62$, $p<.001$), such that these variables shared 27%-38.4% of their variance, indicated two strongly associated, but discrete constructs. Further, there was some evidence of stability of victimization, such that physical victimization at Time 1 was positively correlated with both physical victimization ($r=.70$, $p<.001$), and relational victimization ($r=.39$, $p<.001$) at Time 2. Similarly, relational victimization at Time 1 was positively correlated with Time 2 physical ($r=.52$, $p<.001$) and relational ($r=.74$, $p<.001$) victimization. Neither form of victimization at Time 1 was significantly associated with Time 3 victimization. Similarly, Time 2 physical victimization was not significantly associated with either form of victimization at Time 3; however, Time 2 relational victimization was positively correlated with relational victimization at Time 3 ($r=.19$, $p<.001$).

Cross-Lagged Panel Models

To examine possible mediation effects, analyses followed an iterative process to sequentially examine the significance of individual pathways and changes in pseudo- R^2 for each variable (see Figures 3-6 for pseudo R^2 values) with the inclusion of specific pathways as guided by Cole and Maxwell (2003). Gender and grade at Time 1 were added as covariates at each time

point, and variables within each wave were correlated. In the first model (see Figure 3) all stability and direct effect pathways following the hypothesized mediation model were estimated. In this model, gender was significantly associated with physical victimization at Time 1 ($\mu\beta = -0.23$, $SD = .05$, 95% CI $[-0.33, -0.13]$), Time 2 ($\mu\beta = -0.23$, $SD = .05$, 95% CI $[-0.32, -0.14]$), and Time 3 ($\mu\beta = -.32$, $SD = .06$, 95% CI $[-0.44, -0.19]$), such that boys were more likely to experience physical victimization. Gender was also significantly associated with child anxiety (with girls reporting more anxiety than boys) at Time 1 ($\mu\beta = 0.17$, $SD = .05$, 95% CI $[0.07, 0.28]$), Time 2 ($\mu\beta = .12$, $SD = .05$, 95% CI $[0.02, 0.22]$), and Time 3 ($\mu\beta = .14$, $SD = .07$, 95% CI $[0.01, .27]$). No other significant associations with gender emerged. Grade was not significantly associated with any variables ($\mu\beta = .02-.31$, $SD = .05-.38$).

With regards to the stability pathways, relational victimization at Time 1 predicted relational victimization at Time 2 ($\mu\beta = .41$, $SD = .05$, 95% CI $[.31, .50]$), which subsequently predicted relational victimization at Time 3 ($\mu\beta = .13$, $SD = .07$, 95% CI $[0.01, 0.27]$). Physical victimization at Time 1 predicted physical victimization at Time 2 ($\mu\beta = .46$, $SD = .05$, 95% CI $[0.37, 0.54]$); however, this trend did not continue for Time 3 physical victimization ($\mu\beta = -.11$, $SD = .07$, 95% CI $[-0.25, 0.03]$). Anxiety exhibited temporal stability, such that Time 1 anxiety predicted anxiety at Time 2 ($\mu\beta = 0.28$, $SD = .06$, 95% CI $[0.16, 0.40]$), which, in turn, predicted anxiety at Time 3 ($\mu\beta = .47$, $SD = .08$, 95% CI $[0.31, 0.61]$). Similarly, intolerance of uncertainty exhibited stability across time points, such that Time 1 intolerance of uncertainty predicted Time 2 ($\mu\beta = .54$, $SD = .04$, 95% CI $[0.45, 0.62]$), which in turn predicted Time 3 ($\mu\beta = .45$, $SD = .07$, 95% CI $[.30, .57]$).

Examination of the hypothesized direct effects, indicated that neither Time 1 physical victimization ($\mu\beta = .06$, $SD = .05$, 95% CI $[-0.04, 0.17]$), nor relational victimization ($\mu\beta = -.08$,

SD = .05, 95% CI [-0.18, 0.03]) predicted Time 2 intolerance of uncertainty. Time 1 intolerance of uncertainty did predict anxiety at Time 2 ($\mu\beta = .20$, SD = .06, 95% CI [.08, .33]). Further, relational victimization at Time 2 predicted intolerance of uncertainty at Time 3 ($\mu\beta = .14$, SD = .07, 95% CI [.001, .28]). As the hypothesized mediation pathway from Time 1 victimization to Time 2 intolerance of uncertainty was not significant, indirect effects were not examined. A subsequent model (see Figure 4) added a direct effect from Time 1 forms of victimization to Time 3 anxiety, with results following a similar pattern, except that the pathway from Time 2 relational victimization to Time 3 intolerance of uncertainty dropped to non-significance ($\mu\beta = .13$, SD = .07, 95% CI [-0.02, 0.27]). Further, neither Time 1 relational victimization ($\mu\beta = -.08$, SD = .07, 95% CI [-0.22, 0.06]), nor physical victimization ($\mu\beta = .01$, SD = .08, 95% CI [-0.14, 0.17]) predicted anxiety at Time 3.

Next, a model was estimated to evaluate the reverse causal pathways, such that Time 1 anxiety would predict Time 2 intolerance of uncertainty, which in turn would predict Time 3 victimization (see Figure 5). Results indicated that Time 1 anxiety predicted Time 2 intolerance of uncertainty ($\mu\beta = .23$, SD = .06, 95% CI [.11, .35]); however, this trend did not hold from Time 2 to Time 3 ($\mu\beta = .09$, SD = .09, 95% CI [-0.08, 0.27]). Further, Time 2 intolerance of uncertainty did not subsequently predict either form of peer victimization at Time 3 ($\mu\beta = -.06$ -.11, SD = .07-.07). Once again, due to non-significant mediation pathways, indirect effects were not assessed. Finally, a model was estimated including all direct pathways (i.e., hypothesized and reverse causal pathways; see Figure 6), with results remaining consistent with the previous models, except once again the pathway from Time 2 relational victimization to Time 3 intolerance of uncertainty dropped to marginal significance ($\mu\beta = .14$, SD = .07, 95% CI [-0.001, 0.28]).

Finally, possible gender difference were examined by evaluating whether gender moderated hypothesized direct effects from Time 1 to Time 2, and Time 2 to Time 3. Specifically, a model was estimated that included interaction terms between gender and each form of peer victimization at Time 1 predicting intolerance of uncertainty at Time 2, and an interaction between intolerance of uncertainty at Time 2 and gender predicting anxiety at Time 3. None of the interaction terms were significant ($\mu\beta = -.02-.04$, $SD = .01-.04$), indicating that gender did not significantly moderate hypothesized associations.

Moderation Model

To examine whether intolerance of uncertainty moderated the association between each form of peer victimization at Time 1 and anxiety at Time 3 a separate cross-classified model was estimated.⁴ This model included stability pathways for each variable across time. Further, an interaction term was created between each form of peer victimization and intolerance of uncertainty at Time 1, which was then added as a direct pathway to Time 3 anxiety. Results indicated that intolerance of uncertainty did not moderate associations between either physical victimization ($\mu\beta = -.01$, $SD = .13$, 95% CI $[-.26, .23]$) or relational victimization ($\mu\beta = -.01$, $SD = .09$, 95% CI $[-.17, .17]$) and anxiety longitudinally.

Once again, to examine possible gender differences in these associations, additional interaction terms between gender, intolerance of uncertainty, and each form of peer

⁴ NOTE: To explore moderation at different time points, an initial model was estimated looking at interactions between both forms of peer victimization and intolerance of uncertainty (IOU) at Time 1 predicting anxiety at Time 2, and the same pattern from Time 2 to Time 3. In this larger model, at time 2 the interaction between relational victimization and IOU approached significance ($\mu\beta = -.21$, $SD = .10$, 95% CI $[-.38, -.001]$; however, this effect dropped when looking only at the interaction at Time 2 to Time 3 $\mu\beta = -.21$, $SD = .10$, 95% CI $[-.38, .000]$. To verify this trend, additional simple slope analyses were run looking at IOU at low (-1SD), mean, and high (+1SD) from time 2 to time 3; however, effects were not found in these models ($\mu\beta = -.14- .09$, $SD = .09-.10$, all 95% CIs included 0); therefore, given that the same trend was found for all moderation models, and for better comparison to the mediation model the Time 1 to Time 3 model was retained in the results.

victimization, in addition to all possible two level interactions, were included in a model; however, this model did not converge likely due to model complexity. As a result separate cross-classified models were run to examine possible gender differences for each form of victimization separately (while controlling for the opposing form of victimization at Time 1). The relational victimization model indicated that there were not significant differences between gender ($\mu\beta = .20$, $SD = .12$, 95% CI $[-.05, .43]$).

The cross-classified model examining gender differences in the hypothesized moderation model for physical victimization did not converge. As a result, a follow-up path analysis was estimated to examine possible gender differences. As a method of continuing to address the nestedness of the data, a dichotomous “risk” variable was created, which indicated whether a student was in a classroom that demonstrated a significant association with teacher reported victimization. A path model was then estimated that included the dichotomous risk variable, anxiety and relational victimization at Time 1, and interactions between gender, physical victimization, and intolerance of uncertainty (as well as all possible two level interaction terms). Once again, the model failed to converge. Finally, possible gender differences were examined within a linear regression framework; however, once again the three-way interaction between physical victimization, gender, and intolerance of uncertainty did not demonstrate enough variability to be included in the model. Further, none of the two-way interactions were significant ($ps=.24-.81$). Though hampered by limited variability in physical victimization, results tentatively suggest that the pattern of results is similar for girls and boys.

Discussion

The current study sought to contribute to the existing literature by examining the role of intolerance of uncertainty in the longitudinal link between two forms of peer victimization, physical and relational, and anxiety in an elementary-school aged sample. Though the hypothesized mediation and moderation models were not supported by the present study, the current study supplements the existing research by examining the stability of physical and relational victimization and anxiety in an elementary school sample. Further, the present study introduced a new cognitive process into this relationship, and simultaneously contributed to the growing body of work exploring ways cognitive biases develop in youth, and how these biases influence the development and maintenance of anxiety. Findings from the current study provide implications for treatment of youth anxiety, and guide future research in this area.

Of note, results of the present study indicated that peer victimization predicts subsequent exposure to peer victimization, consistent with previous research (e.g., Cillessen & Lansu, 2015). Within year one physical victimization at Time 1 predicted physical victimization at Time 2; however, this trend did not continue across academic years, such that physical victimization at Time 3 was not predicted by Time 2 physical victimization. Similarly, relational victimization remained stable across all three time points and examination of the mean scores indicated that relational victimization increased across the academic year, with Spring 2016 rates exceeding Fall 2015 and Fall 2016. These trends are consistent with previous research that suggests physical victimization declines as youth mature (Bradshaw et al., 2013; Galen & Underwood, 1997; Pettit, 1997; Tremblay & Nagin, 2005; Williams & Guerra, 2007). Further, findings from the current study contribute to the existing literature that demonstrates an increase in relational victimization as youth enter adolescence (Björkqvist et al., 1992; Murray-Close et al., 2007). It is posited that increases in relational victimization during this timeframe coincide with the

development of social-cognitive skills needed to partake in relational aggression, which inherently increases the presence of relational victimization within this timeframe (Björkqvist et al., 1992; Murray-Close et al., 2007).

Regarding intolerance of uncertainty and anxiety, results of the present study indicate that both constructs remained stable across all three time points. This pattern is especially of note, as the present study is one of the first to longitudinally examine intolerance of uncertainty in an elementary-school aged sample. Stability of intolerance of uncertainty in an elementary-school aged sample is consistent with previous research by Dugas and colleagues (2012) who identified a stable linear trend in intolerance of uncertainty, with scores slightly decreasing across five years, in an adolescent sample. In conjunction with results of the present study, it appears that intolerance of uncertainty may be relatively consistent in elementary-school aged youth, which suggests that it may be appropriate to intervene earlier for youth who report higher intolerance of uncertainty. Notably, results of Dugas and colleagues' (2012) study also indicated a bidirectional effect between intolerance of uncertainty and worry, such that changes in each predicted between 53% to 60% change in the other at subsequent time points.

Similarly to intolerance of uncertainty, anxiety scores remained stable across time in the present study, and further, there was some indication of bidirectional associations between intolerance of uncertainty and anxiety (i.e., between Time 1 and Time 2). In line with developmental theories (Field & Lester, 2010) and previous research (e.g., Dugas et al., 2012) it is possible that anxiety also contributes to the development and further enhancement of cognitive biases, which in turn serve to maintain anxiety symptoms. Taken together, future research should evaluate whether intolerance of uncertainty may represent a cognitive vulnerability for

later anxiety, as well as the directional associations between anxiety and intolerance of uncertainty longitudinally during middle childhood into adolescence.

Returning to the theoretical models of cognitive biases, the present study informed the existing literature by providing empirical examination of a possible risk factor in the development of intolerance of uncertainty, peer victimization. Indeed, while multiple developmental theories related to the development of cognitive biases have been posited, actual research evaluating these processes has been lacking (Field & Lester, 2010; Waters & Craske, 2016). Though the current study did not provide evidence for a mediation model, such that peer victimization lead to increases in intolerance of uncertainty, which in turn contributed to anxiety symptoms, there was tentative support for relational victimization predicting intolerance of uncertainty from time two to time three (Figure 3). The lack of support for the full mediation model was a result of peer victimization at Time 1 failing to predict intolerance of uncertainty at Time 2. Due to limitations in the current study, including the low frequency of peer victimization, additional research is needed to further clarify whether peer victimization actually increases intolerance of uncertainty over time.

Failure to find support for the proposed mediation model may be accounted for by considering a developmental explanation. As previously discussed, across middle childhood into early adolescence there is a decline in physical victimization (Bradshaw et al., 2013; Galen & Underwood, 1997; Pettit, 1997; Williams & Guerra, 2007); therefore, it may be that this decreasing trend reduces the likelihood that youth would develop intolerance of uncertainty as a result of experiencing physical victimization during middle childhood. Comparatively, during this developmental period relational victimization tends to increase, partially ascribed to cognitive maturation, such that youth acquire the necessary social-cognitive abilities that allow

for participation in relational aggression (Björkqvist et al., 1992; Murray-Close et al., 2007). It is possible that the study sample failed to adequately capture this progression, and therefore the lower prevalence of relational victimization within this age range and sample did not contribute to increases in intolerance of uncertainty within the included timeframe. Likewise, changes in cognitive maturation likely contribute to the development of intolerance of uncertainty, especially when considering possible social-environmental contributors.

Specifically, previous research examining differences in future orientation (i.e., the degree to which an individual contemplates future events, or alters their behavior due to future considerations) suggest that older children (i.e., 10-15 year olds) exhibit less future orientation than their adult counterparts (Steinberg et al., 2009). Differences in future orientation across this range correspond to prefrontal cortex development which progresses until individuals reach their mid-20s, and are requisite for engaging in future orientated activities, such as considering possible future events and planning (Casey, Tottenham, Liston, & Durston, 2005). Though the current study demonstrates that elementary-school aged youth exhibit intolerance of uncertainty, which is consistent with previous research showing that youth as young as seven report intolerance of uncertainty (Comer et al., 2009; Read et al., 2013), it is plausible that elementary-school aged youth may not possess the cognitive maturation necessary for victimization experiences to influence their intolerance of uncertainty, or that participants in the current sample did not experience the level of peer victimization that may contribute to the development of intolerance of uncertainty.

One of the limitations of the existing literature is the lack of longitudinal studies examining peer victimization and cognitive biases (e.g., Gianotta et al., 2012; Grills & Ollendick, 2002), and therefore the longitudinal design of the current study builds on previous

research. A few longitudinal studies that have looked at similar factors have found support for associations between peer victimization and cognitions within a year or less (e.g., Barchia & Bussey, 2010; Cole et al., 2016; Sinclair et al., 2012); however, given the limitations of existing examples of longitudinal studies examining these processes, it is possible that the timeframe of the current study (i.e., one year) was not adequate in length to assess the association between peer victimization and intolerance of uncertainty. Further, the relatively low rates of peer victimization reported in the current study compared to previous research with estimates that as many as 60-92% of children are subject to peer victimization at some point during elementary school (Fite et al., 2013; Kochenderfer-Ladd & Wardrop, 2001; Tarshis & Huffman, 2007), suggest that within a year timeframe youth may not have accrued the necessary frequency of victimization experiences (i.e., the learning process) that increases the likelihood of intolerance of uncertainty.

Indeed, when considered in the context of previous theoretical models from the developmental literature (Field & Lester, 2010; Waters & Craske, 2016), and previous research (Creswell, O'Connor, & Brewin, 2006; Hadwin et al., 2006), youth may develop cognitive biases from different environmental sources, such as their parents, and it is possible that other social environmental factors (i.e., peer factors) may contribute to later intolerance of uncertainty (e.g., during adolescence). Specifically, parenting behaviors may communicate danger about uncertainty more directly (e.g., through modeling, or through direct communication; Bayer, Hastings, Sanson, Ukomunne, & Rubin, 2010; Ginsburg & Schlossberg, 2002), allowing youth to develop intolerance of uncertainty during earlier stages of cognitive development. Conversely, the development of intolerance of uncertainty through less direct means (i.e., peer victimization) that require greater cognitive maturity (e.g., future orientation), may not occur

until a later developmental stage. Indeed, youth demonstrate the ability to learn vicariously (i.e., through witnessing others' fear responses) as young as 7 years of age (Reynolds, Fields, & Askew, 2014), suggesting that during early childhood youth may be taught that uncertainty is dangerous through parental modeling.

In contrast, developmental trends in the effectiveness of associative learning indicate that older youth are better equipped to more quickly identify associations between stimulus presentation and possible outcomes than younger children (Cohen et al., 2010; Dumas, 2005). In this scenario, it is possible that the process by which youth develop intolerance of uncertainty following exposure to peer victimization would result from previously learned associations about the uncertainty that they may be victimized (e.g., not knowing whether a teacher will be nearby at recess or whether they will encounter victimization walking home from school), which may occur more readily for older children. Future research should consider evaluating these pathways across a broader developmental sample (e.g., including middle school and high school students), and possibly over a longer period of time (i.e., across multiple years) to further disentangle these trends.

In conjunction with the previously reviewed developmental trends, the frequency of peer victimization may be an important factor. For example, associative learning in this age range may necessitate greater frequency of stimulus presentation (Waters & Craske, 2016); however, based on the current study peer victimization was measured as either present or absent, and chronicity or frequency of peer victimization was not considered. Given that frequency of victimization has been explicitly linked to anxiety outcomes (Stapinski et al., 2014) it is possible that the relatively low frequency of reported peer victimization in the present sample, and the resulting dichotomization of the victimization variables, hindered the ability to demonstrate a

link between peer victimization and intolerance of uncertainty. This assertion is partially supported through the relative stability, and slight increase in relational victimization from Time 1 to Time 2, and the subsequent link between Time 2 relational victimization and Time 3 intolerance of uncertainty.

Results of the current study did not support the hypothesis that intolerance of uncertainty would moderate associations between peer victimization and anxiety. Again, lack of support for this model may have been influenced by the low frequency of peer victimization; however, it is possible that intolerance of uncertainty uniquely contributes to anxiety symptoms, which is supported through the extant research illustrating the role of intolerance of uncertainty in youth anxiety (e.g., Boelen et al., 2010; Comer et al., 2009; Read et al., 2013). Of note, the relatively low occurrence of reported peer victimization in the present study may be the result of both study sample characteristics and methodological considerations. Namely, the present sample was recruited from an elementary school that includes a strong social-emotional curriculum, which likely decreases the occurrence of peer victimization, as well as the deleterious outcomes associated with peer victimization. This notion is supported through previous research that demonstrates a positive school climate represents a protective factor which limits the frequency of peer victimization (Cook, Williams, Guerra, Kim, & Sadek, 2010; Guerra, Williams, & Sadek, 2011).

Indeed, previous research indicates that classroom interventions designed to decrease victimization similarly reduce youth anxiety (Guimond, Brendgen, Vitaro, Dionne, & Boivin, 2015; Williford et al., 2012). Further, reliance on teacher-reported victimization might have resulted in underreporting of victimization given that youth may experience victimization during times with limited teacher supervision (e.g., in the bathroom) or outside of school entirely (Fite

et al., 2013; Turner et al., 2011). Previous research comparing reporters of victimization found that teacher-report demonstrated the most robust association with future psychological sequelae; however, consensus about the frequency of victimization between parents, teachers, and eight-year olds was generally low (Rønning et al., 2009). Future research should incorporate other methods of assessing peer victimization.

Broadly, the school environment itself reflects a substantial factor in the frequency of peer victimization (Cook, Williams, Guerra, Kim, & Sadek, 2010). Indeed, previous research suggests that factors including the classroom environment and teacher characteristics may relate to students' behavior at school, including peer victimization. Relevant to the current study, school climates characterized by a supportive student body, such as in schools with strong social-emotional curricula, decrease the frequency of peer victimization (Cornell, Shukla, & Konold, 2015). Related, a large national survey examining elementary school student behavior found that characteristics, including teachers' views of individual students' behavior may be influenced by the broader classroom environment, such that teachers are more likely to perceive individual students' behavior as more negative or positive dependent on others' in the classroom (i.e., in a classroom where more problematic behaviors occur, a teacher will rate a particular student's behavior as more negative; O'Brennan, Bradshaw, & Furlong, 2014). Taken together, low levels of teacher-reported peer victimization in the current study may be a result of a school climate that contributes to decreased victimization which in turn may influence teachers' ratings of student behavior (i.e., as more positive).

Similarly, factors such as classroom environment may explain why reported peer victimization varies across classrooms. Once again, if a particular classroom includes some students with problematic behavior it may impact a teacher's perception of each individual

student's behavior (O'Brennan et al., 2014). Likewise, previous research has found that if students view a teacher as appropriately responsive to reports of peer victimization they may be more likely to tell teachers about victimization, which would likely influence teachers reported ratings of victimization in their classroom (Cortes & Kochenderfer-Ladd, 2014). Therefore, it appears that both teacher and student perceptions may influence teacher-reported ratings of peer victimization. Given the influence of school climate, teacher and student perceptions (which is likely exacerbated within a small school where teachers and/or students may be more likely to share impressions with one another) on teacher-reported ratings of student behavior the fact that the current study utilized data from a single school reflects a limitation. Future studies should aim to collect data from multiple schools and include larger schools (where teachers may be less likely to share information about specific students with one another) in an effort to improve generalizability of the results.

Finally, despite research indicating possible gender differences in peer victimization (e.g., Erath et al., 2007; Rueger & Jenkins, 2014), intolerance of uncertainty (Barahmand, 2008), and anxiety (Merikangas et al., 2009; Puskar et al., 2009), results of the present study suggest that associations between these variables do not differ by gender. Specifically the link between anxiety and intolerance of uncertainty follows a similar pattern for boys and girls. This finding parallels previous research that found similar correlations between intolerance of uncertainty and anxiety in adolescent girls and boys (Boelen et al., 2010).

Limitations

While the present study contributes to the existing research, in particular the short-term stability of intolerance of uncertainty with school-aged youth, findings must be considered within the context of certain limitations. Firstly, the current study relied on teacher report of peer

victimization, and although this reduced monoinformant bias, teacher report may have resulted in underrepresentation of the frequency of peer victimization. Indeed, despite evidence that teacher-reports of victimization remain stable across time (for a review, see Pouwels, Souren, Lansu, & Cillessen, 2016), there is evidence of disagreement in the frequency of victimization between reporters of victimization (Rønning et al., 2009; Williford, Fite, & Cooley, 2015). Additionally, in the current study multiple teachers provided rating for multiple students. It may be that individual teachers conceptualized anchors on the rating scales (e.g., often versus almost always) differently. Also, teachers may have experienced effects of fatigue after completing ratings for multiple students. Both of these factors may have impacted teacher-ratings of peer victimization and demonstrate the importance of including multiple raters in future work. Future research should incorporate other assessments of peer victimization such as self-report or peer nominations, which have demonstrable evidence of reliability given reliance on multiple sources in identifying victimized youth (Serdiouk, Rodkin, Madill, Logis, & Gest, 2015).

Further, due to low frequency of peer victimization, analyses included dichotomized variables for physical and relational victimization. Use of binary indicators of victimization represents a methodological limitation that likely decreased the opportunity to identify associations between peer victimization and intolerance of uncertainty. Of note, the broader peer victimization literature generally conceptualizes severity of peer victimization as the frequency with which it occurs as compared to the specific act itself (e.g., kicking someone versus pushing someone). This approach, in conjunction with the limited variability in the frequency of peer victimization reported in the current study supports the decision to use a dichotomized peer victimization variable in the current study. In contrast, recent advances in the child maltreatment literature suggest that the most robust measurement of maltreatment should include assessment

of both frequency and severity as distinct processes (Gabrielli, Jackson, Tunno, & Hambrick, 2017), and further that the type of maltreatment may have important implications (Jackson et al., 2016). Taken together, future studies examining peer victimization may consider taking a page from the maltreatment literature and characterizing severity of peer victimization as distinct from the frequency with which it occurs.

As previously stated, it is likely that certain characteristics of the study sample may have also contributed to limited reports of peer victimization. Namely, the current sample included predominantly Caucasian youth from a middle-class background and participants came from a single school. Previous research suggests that other demographic factors, such as socioeconomic status and ethnicity, may contribute to peer victimization (Agirdag, Demanet, van Houtte, & van Avermaet, 2011; Barker et al., 2008). For example, in schools with a larger ethnic minority student population (as compared to schools with a smaller number of ethnic minority students) peer victimization occurs less frequently for students from minority backgrounds (Agirdag et al., 2011). To improve generalizability, replication of the current study across multiple schools is warranted including schools from different settings (e.g., urban versus rural) and with a more diverse student population.

Additionally, the present study included only two forms of victimization, whereas other types of peer victimization, such as cyber-victimization, have also been linked to youth functioning (Turner et al., 2011), and cyber victimization has been identified in youth as young as third grade (Jackson & Cohen, 2012). Thus, future research might include other forms of victimization. For example, a future study may incorporate multiple informants (i.e., self-report, peer nominations, teacher report, and parent report) reporting on multiple forms of peer victimization (e.g., physical, relational, and cyber) to examine the relative contributions of each

form of victimization on the development of intolerance of uncertainty. Further, a future study may consider measuring both the frequency of each form of victimization, as well as assessing the relative severity of peer victimization experiences to better understand the way in which peer victimization may contribute to the development of intolerance of uncertainty (i.e., through repeated exposure, or through severity of a given experience). Additionally, the current study assessed anxiety symptoms utilizing a brief measure of general anxiety symptoms and did not take into account symptoms of specific disorders or differentiate between clinical disorders and presence of symptoms. Though both peer victimization (e.g., Cohen & Kendall, 2015; Grills & Ollendick, 2002) and intolerance of uncertainty (e.g., Boelen et al., 2010; Read et al., 2013) have been independently linked to both anxious symptoms and clinical levels of anxiety, future research might consider examining differences between anxiety symptoms and clinical disorders.

Treatment Implications

Results of the present study provided tentative support for the notion that peer victimization, particularly relational victimization, may contribute to the development of intolerance of uncertainty; however, given some of the previously discussed limitations this finding should be interpreted with caution. Despite the failure to find support for the hypothesized mediation or moderation model, results of the present study contributes to the intolerance of uncertainty and anxiety literature, and provides important implications for treatment. Results of the current study provide initial support that relational victimization may contribute to intolerance of uncertainty in youth; therefore, youth who experience relational victimization may benefit from interventions to reduce intolerance of uncertainty, such as thought challenging or exposures (Chorpita et al., 2011; Holmes, Donovan, & Farrell, 2015; Lewin et al., 2014). Specifically, if youth begin engaging in avoidance or experience significant

distress in certain areas (e.g., a school bathroom) associated with experiencing victimization they may benefit from encouragement to visit these places (i.e., exposure) and reinforcement when they are able to visit such locations, rather than avoiding them. From a school-based intervention model, facilitation of this approach may be enacted by individual teachers in collaboration with school-based mental health professionals or school counselors. For example, teachers may utilize a daily report card and provide nominal reinforcement (e.g., stickers) when students complete an exposure exercise.

Notably, the present study indicated that anxiety and intolerance of uncertainty demonstrate stability during middle childhood, and further demonstrate some bidirectional influences. Taken together, the present study points towards the possible benefit for early intervention for youth who report intolerance of uncertainty as this cognitive distortion contributes to anxiety longitudinally. There is preliminary evidence that intolerance of uncertainty may be a mechanism of change in treatment (Goldman, Dugas, Sexton, & Gervais, 2007), and recent treatment protocols for pediatric generalized anxiety disorder have integrated interventions specifically addressing intolerance of uncertainty (Holmes et al., 2015). Specifically, Holmes and colleagues (2015) developed an intervention (“No Worries!”) that incorporates tasks to address intolerance of uncertainty, including psychoeducation about uncertainty (i.e., all individuals consistently face uncertainty), and decreasing provision of reassurance associated with child questions aimed at establishing certainty, through provision of reinforcements to children when they are able to refrain from asking “certainty” related questions. Though Holmes and colleagues (2015) provide initial evidence of the efficacy of the intervention through discussion of a case study, additional empirical work evaluating the efficacy of the “No Worries!” program is needed. Finally, given that exposures represent a fundamental

component in the treatment of pediatric anxiety (e.g., AACAP, 2007; Chorpita et al., 2011; Lewin et al., 2014), introduction of uncertainty-related exposures (e.g., parents taking youth on a car trip without revealing the plan) may help reduce intolerance of uncertainty, and possibly function as a preventative measure to decrease a child's risk for anxiety longitudinally. Similar strategies may be implemented in a school setting such as educating teachers to decrease reassurance about uncertainty, and use of a school supported behavior plan, as outlined above, to facilitate completion of in-school exposures.

Future Directions

The current study contributes to the growing body of literature examining intolerance of uncertainty in youth, and provides guidance for important next steps. While the present study examined associations between two primary forms of peer victimization, physical and relational victimization, future research should extend examination to include other forms of peer victimization, such as cyber victimization. Indeed, research demonstrates that cyber victimization has been linked to psychological distress in youth and occurs in middle childhood (Jackson & Cohen, 2012; Turner et al., 2011). Additionally, while there is evidence to suggest that intolerance of uncertainty may represent a fundamental cognitive component of anxiety, and possible vulnerability for other cognitive distortions (Carleton, 2016; Hong & Cheung, 2015) future research should examine additional cognitive distortions. Important next steps include examining attention bias to threat, or threat-related interpretation biases, to disentangle the relative specificity of peer victimization as a risk factor for anxiety-related cognitive distortions. For example, future work may seek to model a specific risk process by which youth acquire intolerance of uncertainty based on certain environmental factors (e.g., peer victimization) that facilitate the development of additional biases (e.g., attention bias) and overtime confers risk for

anxiety. Ideally, this future work would include multiple methods of assessing cognitive biases, such as through task-based assessments, as such assessments may better capture an automatic cognitive process and reflect less overlap with specific anxiety symptoms (Miller, 2015).

Previous research suggests that during early childhood youth are able to accurately report on their cognitive experiences (LoBue & Larson, 2010), and overwhelmingly research regarding cognitive distortions in middle childhood utilize questionnaire-based approaches (Miller, 2015); however, future work would likely benefit from incorporating additional types of cognitive biases assessment which may serve to reduce reporting bias (Miller, 2015). Finally, future research should incorporate additional reporters of peer victimization, for example through peer nominations. Incorporating other reporters may serve as a method of increasing the accuracy of the frequency of victimization (Serdiouk et al., 2015) to better clarify the role of peer victimization in the development of intolerance of uncertainty.

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Table 1. Descriptives and correlations

VARIABLE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. T1 PHYS VICT	--													
2. T1 REL VICT	.60**	--												
3. T1 IOU	-.02	.12*	--											
4. T1 ANXIETY	-.03	.07	.66**	--										
5. T2 PHYS VICT	.70**	.52**	-.02	.02	--									
6. T2 REL VICT	.39**	.74**	.16**	.12*	.52**	--								
7. T2 IOU	.01	.02	.54**	.46**	-.03	.08	--							
8. T2 ANXIETY	-.06	.02	.40**	.48**	-.07	.08	.58**	--						
9. T3 PHYS VICT	.30	.08	.13	.03	-.02	.12	.09	.08	--					
10. T3 REL VICT	.13	.11	-.004	-.12	.11	.19**	-.03	-.05	.62**	--				
11. T3 IOU	.02	.15	.54**	.40**	.07	.28**	.42**	.35**	.78*	.18*	--			
12. T3 ANXIETY	-.03	.01	.40**	.43**	-.04	.06	.29**	.53**	.09	.03	.55**	--		
13. GRADE	.07	.09	.03	-.02	.11	.12*	-.01	-.09	.16*	.14*	-.11	-.002	--	
14. GENDER	-.21**	-.02	.06	.18**	-.26**	.05	.27	.20**	-.24**	.09	.03	.23**	-.01	--
MEAN	1.09	1.25	2.10	2.12	1.09	1.32	2.07	2.05	1.06	1.20	1.99	2.03	3.97	-
STANDARD DEVIATION	.31	.58	.28	.93	.30	.62	.80	.81	.22	.47	.74	.90	.78	-
MINIMUM	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3	-
MAXIMUM	3.67	3.67	5.00	5.00	3.00	4.00	5.00	5.00	2.67	3.00	4.58	5.00	5	-
SKEWNESS	4.37	2.42	1.03	0.96	4.23	2.04	1.15	0.97	5.10	2.44	1.03	1.02	-	-
KURTOSIS	22.83	4.94	0.77	0.54	19.88	3.64	1.22	0.77	29.64	5.41	0.86	0.50	-	-

NOTE: Phys Vict = physical victimization; Rel Vict = relational victimization; IOU = intolerance of uncertainty

*p<.05, **p<.01

Table 2. Frequency of teacher-reported peer victimization.

	Present N(%)*
T1 Physical Victimization	32 (9.6%)
T1 Relational Victimization	69 (20.8%)
T2 Physical Victimization	41 (12.5%)
T2 Relational Victimization	88 (26.7%)
T3 Physical Victimization	18(8.7%)
T3 Relational Victimization	39 (18.8%)

*Percentage is based on available data at each timepoint (i.e., 332 at Time 1, 329 at Time 2, and 207 at Time 3).

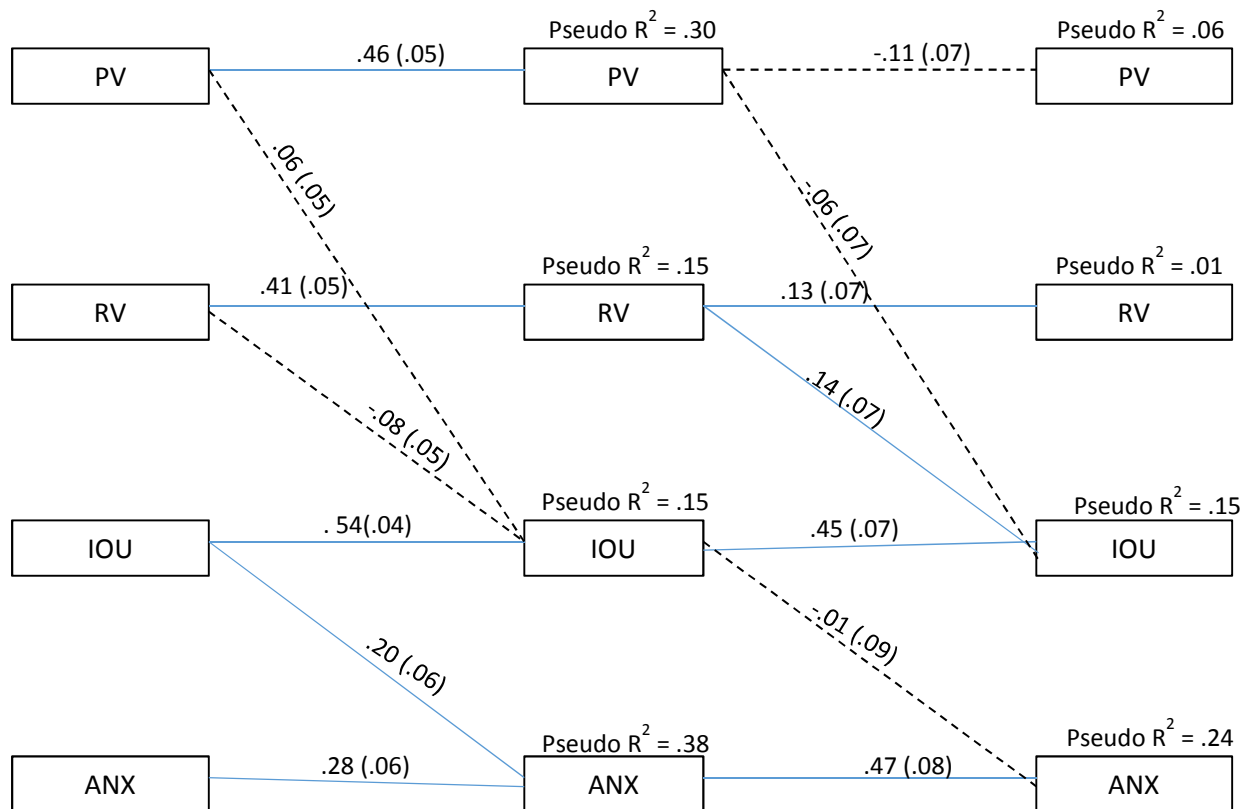


Figure 3. Hypothesized indirect model. PV=Physical victimization; RV=Relational victimization; IOU=Intolerance of Uncertainty; ANX=Anxiety. Dashed lines represent estimated, but not significant pathways. Solid lines indicate significant pathways.

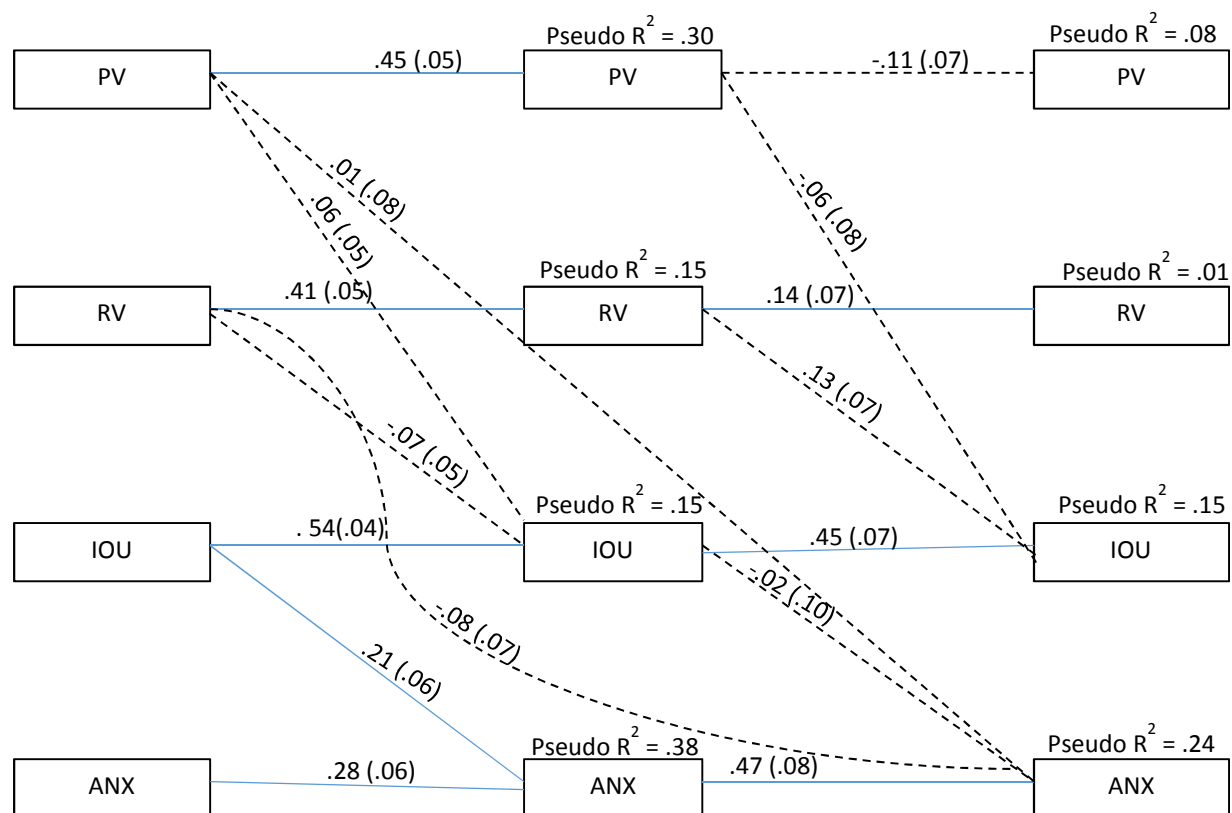


Figure 4. Hypothesized indirect model with additional direct effects. PV=Physical victimization; RV=Relational victimization; IOU=Intolerance of Uncertainty; ANX=Anxiety. Dashed lines represent estimated, but not significant pathways. Solid lines indicate significant pathways.

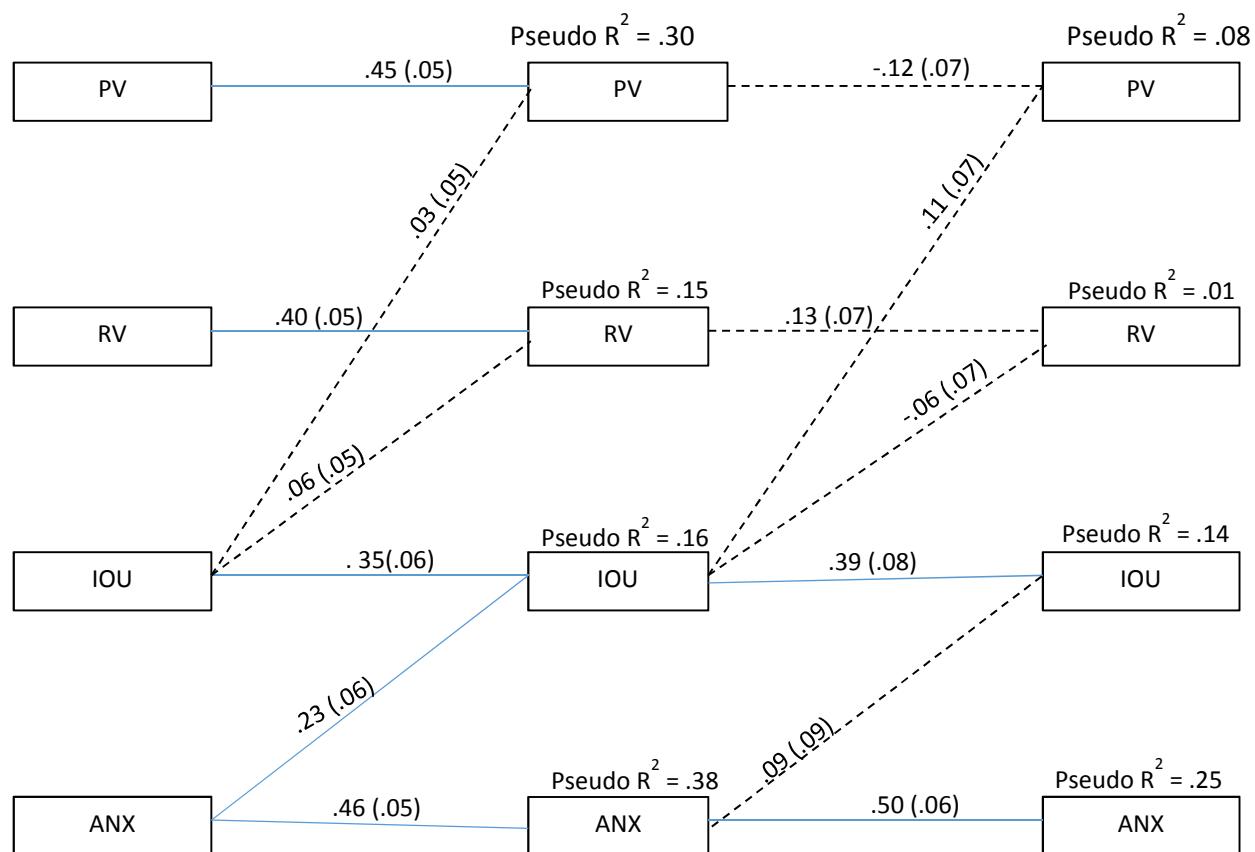


Figure 5. Reverse indirect model. PV=Physical victimization; RV=Relational victimization; IOU=Intolerance of Uncertainty; ANX=Anxiety. Dashed lines represent estimated, but not significant pathways. Solid lines indicate significant pathways.

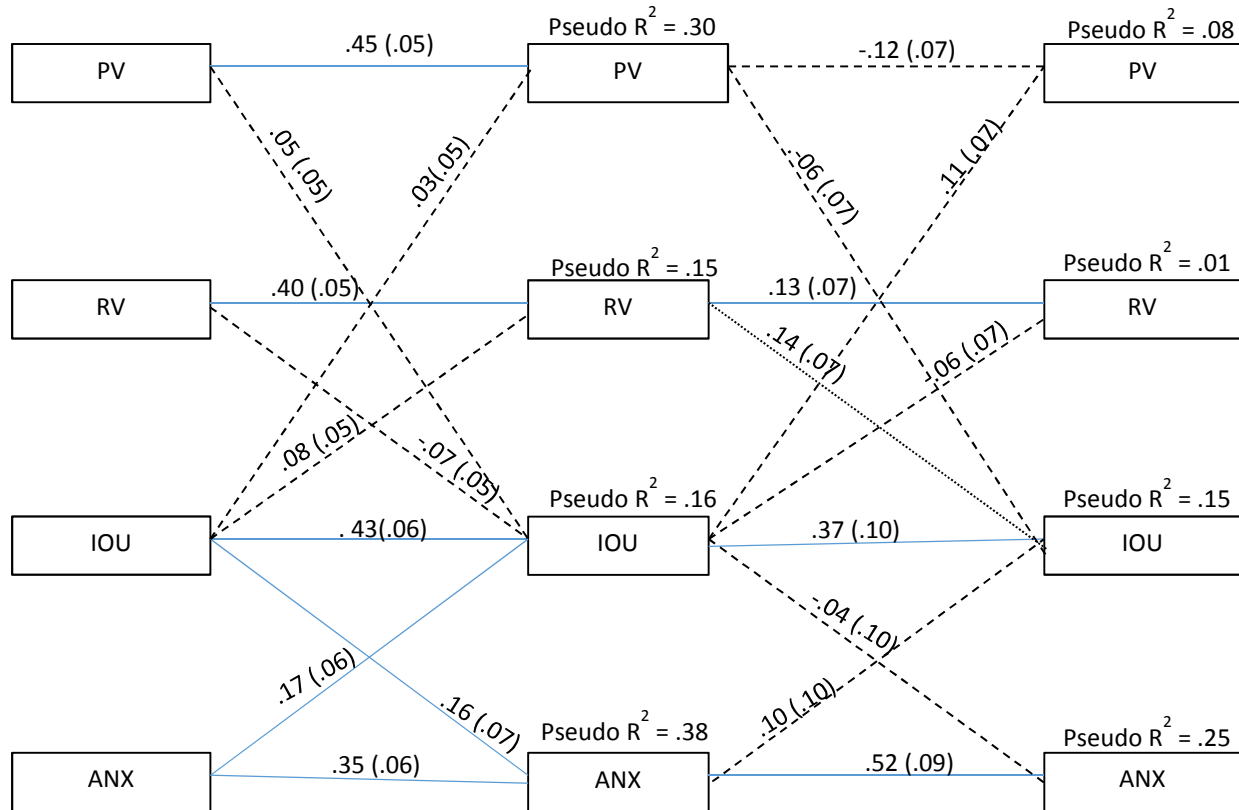


Figure 6. All causal pathways. PV=Physical victimization; RV=Relational victimization; IOU=Intolerance of Uncertainty; ANX=Anxiety. Dashed lines represent estimated, but not significant pathways. Solid lines indicate significant pathways. The dotted line represents a marginally significant pathway.

Appendix: Study Measures
Child-Reported Demographics

1. How old are you?	6 7 8 9 10 11 12
2. Are you a boy or a girl?	Boy Girl

Physical and Relational Victimization (Crick & Bigbee, 1998)

Instructions: Each phrase below tells how kids might act at school. Please read each phrase. Then, rate how often you observe these things happening with the child in the past year using the following scale:

	Never	Rarely	Sometimes	Often	Almost Always
1. Gets hit, kicked, punched by others	1	2	3	4	5
2. Gets pushed and shoved by others	1	2	3	4	5
3. Gets threatened to be beat up by others	1	2	3	4	5
4. Gets left out of the group when at play or activity time because one of their friends is mad at them	1	2	3	4	5
5. Gets ignored by other kids when someone is mad at them	1	2	3	4	5
6. Other kids tell rumors about them behind their backs	1	2	3	4	5

Intolerance of Uncertainty Scale Short Form for Children (IUS-C; Boulter et al., 2014)

Instructions: Below is a series of statements. Please circle the number that describes you best.

	Not like Me		Moderately Like Me		Entirely Like Me
1. When things happen suddenly, I get very upset	1	2	3	4	5
2. It bothers me when there are things I don't know	1	2	3	4	5
3. People should always think about what will happen next. This will stop bad things from happening.	1	2	3	4	5
4. Even if you plan things really well, one little thing can ruin it.	1	2	3	4	5
5. I always want to know what will happen to me in the future.	1	2	3	4	5
6. I can't stand it when things happen suddenly.	1	2	3	4	5
7. I should always be prepared before things happen.	1	2	3	4	5
8. Feeling unsure stops me from doing most things.	1	2	3	4	5
9. When I'm not sure what to do I freeze.	1	2	3	4	5
10. When I don't know what will happen, I can't do things very well.	1	2	3	4	5
11. The smallest worry can stop me from doing things.	1	2	3	4	5
12. I must get away from all things I am unsure of.	1	2	3	4	5

**Patient-Reported Outcome Measurement Information System (PROMIS) Pediatric
Anxiety-Short Form (Irwin et al., 2010)**

Instructions: Please respond to each question or statement by circling the most appropriate response according to how often the statement is true about you.

	Never	Rarely	Sometimes	Often	Always
1. I felt like something awful might happen.	1	2	3	4	5
2. I felt nervous.	1	2	3	4	5
3. I felt scared.	1	2	3	4	5
4. I felt worried.	1	2	3	4	5
5. I worried when I was at home.	1	2	3	4	5
6. I got scared really easy.	1	2	3	4	5
7. I worried about what could happen to me.	1	2	3	4	5
8. I worried when I went to bed at night.	1	2	3	4	5

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